

# Difference Between Myeloblast and Lymphoblast

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## Key Difference - Myeloblast vs Lymphoblast

Blood cells are of two main types depending on their immature forms in the bone marrow. They are Myeloblasts and Lymphoblasts. Myeloblasts are immature blood cells produced in the bone marrow which give rise to granulocytes such as basophils, eosinophils, and neutrophils through the process called granulopoiesis. Lymphoblasts are blood cells produced in the bone marrow which give rise to lymphocytes that includes B lymphocytes and T lymphocytes through a process called lymphopoiesis. The **key difference** between Myeloblasts and Lymphoblasts are the type of cells they produce. **Myeloblasts produce granulated blood cells whereas Lymphoblasts produce lymphocytes.**

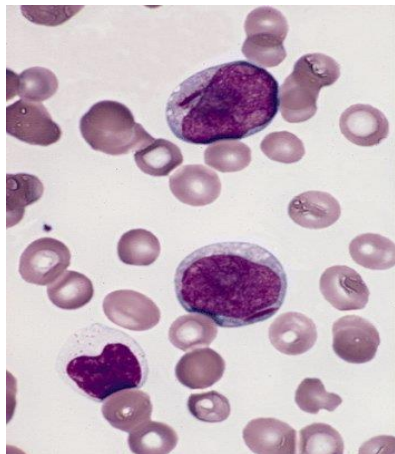
## What is a Myeloblast?

Myeloblasts are nucleated cells which have a cell diameter of about 20  $\mu\text{m}$ . They have a prominent nucleus, and the nucleus takes a curved shaped. Myeloblasts are immature cells and undergo a process termed as Granulopoiesis to develop into mature granulocytes.

The process of granulopoiesis includes three main steps.

- Step 01 - Transformation of Myeloblasts to promyelocytes
- Step 02 - Transformation of promyelocytes to myelocytes
- Step 03 - Development of myelocytes to mature granulocytes

There are three main granulocytes produced from Myeloblasts. They include eosinophils, basophils, and neutrophils. They have a functional role in both innate and adaptive immunity. The promyelocytes are undifferentiated and primary granules which appear in reddish purple color upon staining are present in them. There are different staining procedures done on Myeloblasts. Some of them are PAS staining and Sudan black staining.



**Figure 01: Myeloblast**

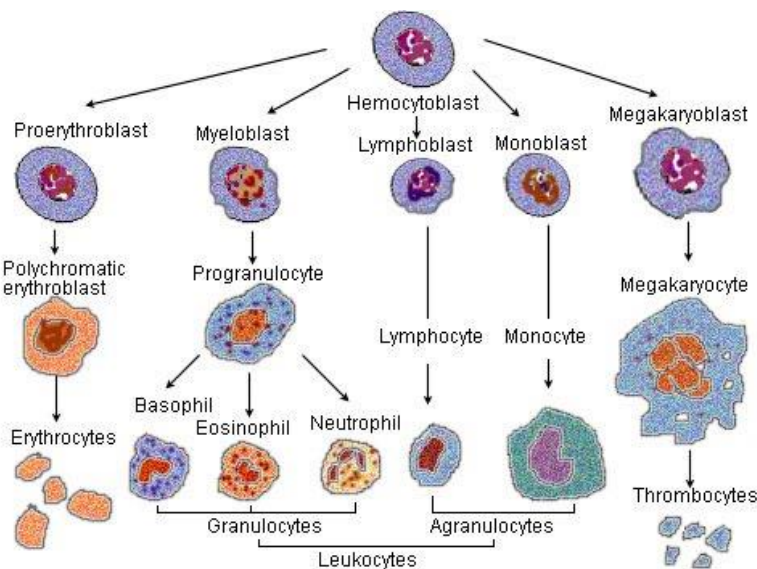
Acute myeloblastic leukemia is a cancer condition in the blood where malfunctioning of Myeloblasts is observed. It is a condition of cancer where the uncontrollable proliferation of abnormal Myeloblasts can be observed. This results in the disruption of blood cells which will cause [anemia](#), hematopoietic failure, and energy deprived conditions

## What is a Lymphoblast?

Lymphoblast is an immature precursor of [agranulocyte](#). Agranulocyte includes the [white blood cell types](#); T and B lymphocytes. Lymphoblasts have a diameter of about 15µm. It has a large nucleus with a thin layer of peripheral cytoplasm. The lymphoblasts which are produced in the bone marrow then enters secondary immune organs such as the [thymus](#) in order to undergo maturation.

The development of [T and B cells](#) takes place through the process known as Lymphopoiesis. Lymphopoiesis starts at the bone marrow from the lymphoblast. The first step is the differentiation step. The T and B cell [progenitor cells](#) are separated. This is known as the differentiation of B progenitor cells and non B progenitor cells. This is an antigen-dependent process. The B progenitor cell development is supported by different [interleukins](#), which includes IL-1, IL-2, IL-4, IL-10, and interferon gamma. The B-cell precursors present in the bone marrow are known as hematogones. These hematogones are then transferred out of the bone marrow to secondary immune organs to be developed into mature B cells and T cells which play an important role in adaptive immunity.

The non B cell progenitors develop into T cells, or Natural killer cells both of which are involved in the complete destruction of pathogens entering the system and some T cells are capable of inducing [antibody](#) production.



**Figure 02: Lymphoblast**

The alterations and overproduction of lymphoblasts lead to a condition known as acute lymphoblastic leukemia. This is a state of cancer in the blood and brings about a lot of complications in terms of immune system malfunction. The patients with acute lymphoblastic leukemia are immunocompromised, and there is a high probability of secondary infections.

## What are the Similarities Between Myeloblast and Lymphoblast?

- Both are derived from hematopoietic stem cells.
- Both are precursor immature cells.
- Both give rise to different types of white blood cells.
- Both are initially found in the bone marrow.
- Both have the ability to differentiate into specialized cells.
- Both are nucleated.
- Both can be stained and observed under the microscope.
- Both functions in maintaining the immunity of an organism.
- Both lead into formation of leukemia under abnormal conditions.

## What is the Difference Between Myeloblast and Lymphoblast?

<b>Myeloblast vs Lymphoblast</b>	
Myeloblasts are immature blood cells produced in the bone marrow which give rise to granulocytes.	Lymphoblasts blood cells produced in the bone marrow which give rise to B lymphocytes and T lymphocytes.
<b>Development process</b>	
Granulopoiesis is the development process of Myeloblast.	Lymphopoiesis is the development process of Lymphoblasts.
<b>Types of cells produced</b>	
Myeloblast produces granulocytes such as basophils, eosinophils, neutrophils.	Lymphoblast produces Agranulocytes such as T and B lymphocytes.
<b>Cytoplasm</b>	
Cytoplasm of Myeloblast is granulated.	Cytoplasm of Lymphoblast is non – granulated.
<b>Type of leukemia</b>	
Acute myeloblastic leukemia is the result of the abnormal proliferation of myeloblast.	Acute lymphoblastic leukemia is the result of the abnormal proliferation of lymphoblast.

# Summary - Myeloblast vs Lymphoblast

Myeloblasts and lymphoblasts are hematopoietic stem cells present in the bone marrow. Myeloblasts develop into granulocytes of white blood cells whereas lymphoblasts develop into agranulocytes of white blood cells. These two cells are widely studied due to the role they play in the development of acute leukemia. This is the difference between Myeloblasts and Lymphoblasts.

## Reference:

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2. "Myeloblast." Myeloblast - an overview | ScienceDirect Topics. [Available here](#)
3. Rachita. "Difference Between." Difference Between Similar Terms and Objects, 17 Oct. 2014. [Available here](#)

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